

# INDEX.

## VOLUME LXVIII.

(VOLUME VIII, NEW SERIES.)

1894.

### ILLUSTRATIONS.

Academy and Home for Shipbuilders, 276.  
Acme Nut-Facing Machine, 526.  
"Admiral Seniavin," The New Russian Armored Ship, 512.  
Air Compressor, The Norwalk Compound, 76.  
Air Compressors, Transmission of Power, with an Analysis of Compound, 368.  
Air-Duster, 5-in., 528.  
Air-Duster Nozzle, Chicago, Rock Island & Pacific Railroad, 329.  
Air-Duster Nozzle, Cleveland, Cincinnati, Chicago & St. Louis Railway, 326.  
Air-Hoist for Loading Wheels and Axles, 327.  
Air-Hose Fittings, Machine for Applying, 326.  
Air-Pump for Third-Class Torpedo-Boat, 458.  
Air-Pumps on the United States Cruiser "New York," 96.  
American and English Locomotives, 9.  
Apparatus for Rapid Loading of Coal into Ships, 67.  
Ashley's Safety Automatic Gauge-Cock, 429.  
Atwood & Perkins' Engine, 239.  
Automatic Water-Tank, 303.  
Baguelley's Valve Gear, 553.  
Baker's Safety Vent, 303.  
Baldwin Locomotive Works, Boilers and Boiler-Room at the, 215.  
Balloon at the Antwerp Exhibition, Navigable, 477.  
Baltimore and Ohio's Belt Line, The, 513.  
Baltimore and Ohio's Belt Line, Truck of Electric Locomotive for the, 513.  
Band Re-Sawing Machine, 568.  
Battleship "Texas," The, 103.  
Beaudry's Power Hammer, 572.  
Beaumont-Wallington High-Speed Engine, The, 422.  
Béché's Pneumatic Hammer, 572.  
Belpaire Boiler on the Lehigh Valley Railroad, 346.  
Bicyclette Car, Brown's, 511.  
Bicyclette Electric Passenger Car, 510.  
Bliss Flexible Clutch Pulley, 525.  
Blower and Engine for Third-Class Torpedo-Boat, 458.  
Blower, Green's Rotary, 238.  
Boiler Locomotive for the Belgian State Railway, Triple, 273.  
Boiler on the Lehigh Valley Railroad, Belpaire, 346.  
Boiler, Plummer's Smokeless, 238.  
Boiler, Worthington's Sectional Steam, 570.  
Boilers and Boiler-Room at the Baldwin Locomotive Works, 215.  
Boilers and Feed-Pumps of the United States Battleship "Texas," 504.  
Boilers and the "Ellis & Eaves" Suction Draft, Recent Experiences with Cylindrical, 453.  
Boilers, Water-Tube, 302.  
Boilers with Ellis & Eaves' Hot-Air and Suction System, 455.  
Brown's Electric Railway Car, 476.  
Brown's High-Speed Engine, 459.  
Brown Traveling Crane, The, 409.  
Buffington-Crozier Disappearing Gun Carriage, The, 59.  
Buildings, Transporting, 118.  
Butman's Mechanical Stoker, 570.  
Cantilever Bridge, Built in the Province of Etchin in 1655, A Japanese, 506.

Capital Vises and Jack Screws, 336.  
Car Buffer, Richards' 384.  
Car, Defensive Railroad, 287.  
Carrier for Wheel Lathe, 124.  
Car Shops of the Lehigh Valley Railroad at Packer-ton, Pa., 497.  
Cars, Metal Underframes for Freight, 90.  
Cast-Iron Pulleys (Double Arms), Dimensions of, 256.  
Caucasus Range, The Government New Location for the Railroad Across the Main, 28.  
Central Railroad of New Jersey, Suburban Stations on the, 124.  
Centrifugal Pump, Compound Vertical, Fig. 22, 503.  
Centrifugal Pumps, 411, 461, 500.  
Chains, Method of Manufacturing Weldless, 20.  
Check Valve, 288.  
"Cincinnati," United States Cruiser, 444.  
Cinder Trap, 405.  
Circulation on Evaporative Efficiency of Water-Tube Boilers, The Influence of, 410.  
Coal into Ships, Apparatus for Rapid Loading of, 67, 112.  
Cole's Metallic Rod Packing, 571.  
Combined Screw and Hydraulic Jack, 544.  
Combined Screw and Hydraulic Punch, 492.  
Compound Air Compressors, Transmission of Power, with an Analysis of, 369.  
Compound Engines, 1.  
Compound Engines, Wightman's Starting Appliance for, 431.  
Compound Locomotive, Richmond, 305.  
Compound Mogul Freight Engine Built by the Pittsburgh Locomotive Works, 71.  
Compressed Air in Paris, Methods of Distributing, 466.  
Contributions to Practical Railroad Information, 372.  
Copper and Lead in Phosphor-Bronze, Method of Determining, 449.  
Cracks in Fire-Box Sheets, 127.  
Crane, A 40-Ton Dock, 452, 453.  
Crane Car with Air Hoist on the Fall Brook Coal Co.'s Railroad, 496.  
Crane of Her Majesty's Dock-Yard, Chatham, 160-Ton, 164.  
Crane, One-Ton Traveling, 31.  
Cromwell's Smoke-Box, 84.  
De Laval's Steam Turbine, 381.  
Delaware & Hudson Canal Company, Standard Mogul Freight Locomotive of the, 250.  
Delaware & Hudson Shop Tools, 440.  
Draft-Sill for Cars, Salveter's Metal, 142.  
Draw-Gear for Cars, Cole & Greeve's, 144.  
Dredging-Bucket, Symonds', 238.  
Driggs-Schroeder Rapid-Fire Guns, The, 39.  
Drills, New Method of Driving, 235.  
Drill, The Moffet Portable, 283.  
Driving Springs, Device for Removing, 537.  
Drop Pit, Passenger Truck, 325.  
Drop Tank, 445.  
Duluth, Missabe & Northern Railway, Bridge on, 276.  
Dunbar's Piston-Packing Rings, 134.  
Electrical Energy in the Mills of Forrest & Co. at St. Etienne, Distribution of, 558.

Electric Railway, The Motive Power Required for an, 367.  
Emery Testing Machine, Recent Improvements in the, 177.  
Engine, A Heavy-Duty Slide-Valve, 284.  
Engine and Dynamo, Direct Connection, 335.  
Engine and Tender Connection on the Pennsylvania Railway, 362.  
Engine, Atwood & Perkins', 239.  
Engine, Brown's High-Speed, 459.  
Engine Built by the Pittsburgh Locomotive Works, Compound Mogul Freight, 71.  
Engine, Delaware & Hudson Canal Co. Standard Mogul Passenger, 298.  
Engine Clearance Condensation, Cylinder and Initial, Figs. 3, 4, 6, 7, 504.  
Engineer's Career Represented Graphically, An, 119.  
Engine for Tug "W. G. Wilmot," Triple-Expansion, 315.  
Engines of the German Railway Union, Some, 307.  
Engines of the United States Battleship "Texas," Triple-Expansion, 353.  
Engine, Tank, 228.  
Engine, The Beaumont-Wallington High-Speed, 422.  
Engine, Three-Cylinder, 125.  
Engine, Truesdell's Compound Oscillating, 239.  
English Locomotives, American and, 9.  
Expansion of Locomotive Fire-Boxes, Experiments on the, 114.  
Express Passenger Locomotive for the Midland Railway, 361.  
Fay's Engine Valve, 191.  
Finlayson Water-Tube Boiler, 568.  
Fire-Boxes, Experiments on the Expansion of Locomotive, 114.  
Fire-Box Sheets, Cracks in, 127.  
Fire-Box, Von Dormus' Locomotive, 287.  
Fire Kindler for Kindling Locomotive Fires with Crude Oil Instead of Wood, The Leslie Patent Locomotive, 304.  
Flight so Difficult of Invention? Why is, 573.  
Flint & Père Marquette Railroad, Locomotive for Local Traffic on the, 263.  
Flying Machine, Mr. Maxim's, 405.  
Fuel Oil Burner, The Thurman, 428.  
Fuel on the French, English and Belgian Railways, The Handling of, 13.  
Gear Presses, Projectile and, 87.  
German Railway Union, Some Engines of the, 307.  
Gettysburg to Baltimore, Electric Railroad from, 465.  
Gold's Pressure Regulator, 239.  
Goldsdorf's Compound Locomotive, 573.  
Government New Location for the Railroad Across the Main Caucasus Range, The, 28.  
Grand Central Railway of Belgium, Signal Apparatus in Use on the, 209.  
Graphically, An Engineer's Career Represented, 119.  
Graphite Paint, L. S. G., 284.  
Green's Rotary Blower, 238.  
Grindstone Truing Device, 33.  
Hancock Locomotive Inspirator, The, 474.

# INDEX.

## VOLUME LXVIII.

(VOLUME VIII, NEW SERIES.)

1894.

### ILLUSTRATIONS.

- Academy and Home for Shipbuilders, 276.  
Acme Nut-Facing Machine, 526.  
"Admiral Seniavin," The New Russian Armored Ship, 512.  
Air Compressor, The Norwalk Compound, 76.  
Air Compressors, Transmission of Power, with an Analysis of Compound, 368.  
Air-Duster, 5-in., 528.  
Air-Duster Nozzle, Chicago, Rock Island & Pacific Railroad, 329.  
Air-Duster Nozzle, Cleveland, Cincinnati, Chicago & St. Louis Railway, 326.  
Air-Hoist for Loading Wheels and Axles, 327.  
Air-Hose Fittings, Machine for Applying, 326.  
Air-Pump for Third-Class Torpedo-Boat, 458.  
Air-Pumps on the United States Cruiser "New York," 96.  
American and English Locomotives, 9.  
Apparatus for Rapid Loading of Coal into Ships, 67.  
Ashley's Safety Automatic Gauge-Cock, 429.  
Atwood & Perkins' Engine, 239.  
Automatic Water-Tank, 303.  
Baguelley's Valve Gear, 553.  
Baker's Safety Vent, 303.  
Baldwin Locomotive Works, Boilers and Boiler-Room at the, 215.  
Balloon at the Antwerp Exhibition, Navigable, 477.  
Baltimore and Ohio's Belt Line, The, 513.  
Baltimore and Ohio's Belt Line, Truck of Electric Locomotive for the, 513.  
Band Re-Sawing Machine, 568.  
Battleship "Texas," The, 103.  
Beaudry's Power Hammer, 572.  
Beaumont-Wallington High-Speed Engine, The, 422.  
Béché's Pneumatic Hammer, 572.  
Belpaire Boiler on the Lehigh Valley Railroad, 346.  
Bicyclette Car, Brown's, 511.  
Bicyclette Electric Passenger Car, 510.  
Bliss Flexible Clutch Pulley, 525.  
Blower and Engine for Third-Class Torpedo-Boat, 458.  
Blower, Green's Rotary, 238.  
Boiler Locomotive for the Belgian State Railway, Triple, 273.  
Boiler on the Lehigh Valley Railroad, Belpaire, 346.  
Boiler, Plummer's Smokeless, 228.  
Boiler, Worthington's Sectional Steam, 570.  
Boilers and Boiler-Room at the Baldwin Locomotive Works, 215.  
Boilers and Feed-Pumps of the United States Battleship "Texas," 504.  
Boilers and the "Ellis & Eaves" Suction Draft, Recent Experiences with Cylindrical, 453.  
Boilers, Water-Tube, 302.  
Boilers with Ellis & Eaves' Hot-Air and Suction System, 455.  
Brown's Electric Railway Car, 476.  
Brown's High-Speed Engine, 459.  
Brown Traveling Crane, The, 409.  
Buffington-Crozier Disappearing Gun Carriage, The, 59.  
Buildings, Transporting, 118.  
Butman's Mechanical Stoker, 570.  
Cantilever Bridge, Built in the Province of Etchin in 1655, A Japanese, 506.  
Capital Vises and Jack Screws, 336.  
Car Buffer, Richards' 384.  
Car, Defensive Railroad, 287.  
Carrier for Wheel Lathe, 124.  
Car Shops of the Lehigh Valley Railroad at Packer-ton, Pa., 497.  
Cars, Metal Underframes for Freight, 90.  
Cast-Iron Pulleys (Double Arms), Dimensions of, 256.  
Caucasus Range, The Government New Location for the Railroad Across the Main, 28.  
Central Railroad of New Jersey, Suburban Stations on the, 124.  
Centrifugal Pump, Compound Vertical, Fig. 22, 503.  
Centrifugal Pumps, 411, 461, 500.  
Chains, Method of Manufacturing Weldless, 20.  
Check Valve, 288.  
"Cincinnati," United States Cruiser, 444.  
Cinder Trap, 405.  
Circulation on Evaporative Efficiency of Water-Tube Boilers, The Influence of, 410.  
Coal into Ships, Apparatus for Rapid Loading of, 67, 112.  
Cole's Metallic Rod Packing, 571.  
Combined Screw and Hydraulic Jack, 544.  
Combined Screw and Hydraulic Punch, 492.  
Compound Air Compressors, Transmission of Power, with an Analysis of, 369.  
Compound Engines, 1.  
Compound Engines, Wightman's Starting Appliance for, 431.  
Compound Locomotive, Richmond, 305.  
Compound Mogul Freight Engine Built by the Pittsburgh Locomotive Works, 71.  
Compressed Air in Paris, Methods of Distributing, 466.  
Contributions to Practical Railroad Information, 372.  
Copper and Lead in Phosphor-Bronze, Method of Determining, 449.  
Cracks in Fire-Box Sheets, 127.  
Crane, A 40-Ton Dock, 452, 453.  
Crane Car with Air Hoist on the Fall Brook Coal Co.'s Railroad, 496.  
Crane of Her Majesty's Dock-Yard, Chatham, 160-Ton, 164.  
Crane, One-Ton Traveling, 31.  
Cromwell's Smoke-Box, 84.  
De Laval's Steam Turbine, 381.  
Delaware & Hudson Canal Company, Standard Mogul Freight Locomotive of the, 250.  
Delaware & Hudson Shop Tools, 440.  
Draft-Sill for Cars, Salveter's Metal, 142.  
Draw-Gear for Cars, Cole & Greeve's, 144.  
Dredging-Bucket, Symonds', 238.  
Driggs-Schroeder Rapid-Fire Guns, The, 39.  
Drills, New Method of Driving, 235.  
Drill, The Moffet Portable, 283.  
Driving Springs, Device for Removing, 537.  
Drop Pit, Passenger Truck, 325.  
Drop Tank, 445.  
Duluth, Missabe & Northern Railway, Bridge on, 276.  
Dunbar's Piston-Packing Rings, 134.  
Electrical Energy in the Mills of Forrest & Co. at St. Etienne, Distribution of, 558.  
Electric Railway, The Motive Power Required for an, 367.  
Emery Testing Machine, Recent Improvements in the, 177.  
Engine, A Heavy-Duty Slide-Valve, 284.  
Engine and Dynamo, Direct Connection, 335.  
Engine and Tender Connection on the Pennsylvania Railway, 362.  
Engine, Atwood & Perkins', 239.  
Engine, Brown's High-Speed, 459.  
Engine Built by the Pittsburgh Locomotive Works, Compound Mogul Freight, 71.  
Engine, Delaware & Hudson Canal Co. Standard Mogul Passenger, 298.  
Engine Clearance Condensation, Cylinder and Initial, Figs. 3, 4, 6, 7, 504.  
Engineer's Career Represented Graphically, An, 119.  
Engine for Tug "W. G. Wilmot," Triple-Expansion, 315.  
Engines of the German Railway Union, Some, 307.  
Engines of the United States Battleship "Texas," Triple-Expansion, 353.  
Engine, Tank, 228.  
Engine, The Beaumont-Wallington High-Speed, 422.  
Engine, Three-Cylinder, 125.  
Engine, Truesdell's Compound Oscillating, 239.  
English Locomotives, American and, 9.  
Expansion of Locomotive Fire-Boxes, Experiments on the, 114.  
Express Passenger Locomotive for the Midland Railway, 361.  
Fay's Engine Valve, 191.  
Finlayson Water-Tube Boiler, 568.  
Fire-Boxes, Experiments on the Expansion of Locomotive, 114.  
Fire-Box Sheets, Cracks in, 127.  
Fire-Box, Von Dormus' Locomotive, 287.  
Fire Kindler for Kindling Locomotive Fires with Crude Oil Instead of Wood, The Leslie Patent Locomotive, 304.  
Flight so Difficult of Invention? Why is, 573.  
Flint & Père Marquette Railroad, Locomotive for Local Traffic on the, 263.  
Flying Machine, Mr. Maxim's, 405.  
Fuel Oil Burner, The Thurman, 428.  
Fuel on the French, English and Belgian Railways, The Handling of, 13.  
Gear Presses, Projectile and, 87.  
German Railway Union, Some Engines of the, 307.  
Gettysburg to Baltimore, Electric Railroad from, 465.  
Gold's Pressure Regulator, 239.  
Goldsdorf's Compound Locomotive, 573.  
Government New Location for the Railroad Across the Main Caucasus Range, The, 28.  
Grand Central Railway of Belgium, Signal Apparatus in Use on the, 209.  
Graphically, An Engineer's Career Represented, 119.  
Graphite Paint, L. S. G., 284.  
Green's Rotary Blower, 238.  
Grindstone Truing Device, 33.  
Hancock Locomotive Inspirator, The, 474.



Transport  
Halmes  
7-23-29

## ILLUSTRATIONS.

iii

Hannan's Coal Stoker, 571.  
Heating Furnace, Closed, 446.  
Heavy-Duty Slide-Valve Engine, A, 284.  
Helmholtz's Locomotive Running-Gear, 236.  
Hoist for Loading and Unloading Cars, 325.  
Hoist for Loading Wheels and Axles, Air, 327.  
Hose Connections, Plan for Applying, 327.  
Hose Testing Machine, 448.  
Horizontal Drilling Attachment, 31.  
Hornellville Shops, The, 444.  
Humphrey's Wrench, 240.  
Hunt's Journal Bearing, 142.  
Hydraulic Boat Lifts, 211.  
Hydrostatic Testing Machine, 327.  
  
Inclined Planes of the Morris Canal, 555.  
Iron in Commercial Spelter, Method of Determining, Fig. 1, 519.  
  
Jack for Wheel Pit, Pit, 325.  
Jack for Wheel Pit, Telescope, 325.  
Jack, 13-inch Pneumatic, 328.  
Jacket Punch Machine, 33.  
Jack, Shop Truck, 325.  
Japan, Railway Construction in, 365.  
Journal Bearing, Hunt's, 142.  
  
Kinsman Block System, 225.  
Klein & Linder Locomotive, The, 487.  
Knowles Automatic Exhaust Relief Valve, The, 426.  
  
Lehigh Valley Railroad, Belpaire Boiler on the, 346.  
Leslie Patent Locomotive Fire Kindler for Kindling Locomotive Fires with Crude Oil Instead of Wood, The, 304.  
Lifts, Hydraulic Boat, 211.  
Link, Warren's Shifting, 572.  
Loading of Coal into Ships, Apparatus for Rapid, 67, 112.  
Locomotive, Delaware & Hudson Canal Co., Standard Mogul Passenger, 298.  
Locomotive Engine, 143.  
Locomotive Fire-Boxes, Experiments on the Expansion of, 114.  
Locomotive Fire-Box, Von Dormus', 287.  
Locomotive Fire Kindler for Kindling Locomotive Fires with Crude Oil Instead of Wood, The Leslie Patent, 304.  
Locomotive for Local Traffic on the Flint & Pèrre Marquette Railroad, 263.  
Locomotive for the Belgian State Railway, Triple-Boiler, 273.  
Locomotive for the Boston & Albany Railroad, Eight-Wheeled Passenger, 494.  
Locomotive for the Central Railway of Brazil, Mastodon, 509.  
Locomotive for the Midland Railway, Express Passenger, 361.  
Locomotive, Four-Wheeled Coupled Bogie Tank, 169.  
Locomotive, Gölsdorf's Compound, 573.  
Locomotive, Helmholtz's, 286.  
Locomotive History, 390.  
Locomotive, London & Western Railway, Eight-Wheeled Coupled Compound (Webb's System) Coal, 516.  
Locomotive of the Delaware & Hudson Canal Co., Standard Mogul Freight, 250.  
Locomotive Problem, The, 8, 55.  
Locomotive, Richmond Compound, 305.  
Locomotive Running-Gear, Helmholtz's, 236.  
Locomotives, American and English, 9.  
Locomotive "Samson," 131.  
Locomotives of the German Railway Union, Some, 307.  
Locomotives of the New York, Lake Erie and Western Railroad, 564.  
Locomotives on the Manchester, Sheffield & Lincolnshire Railway, Standard, 405.  
Locomotive, Tank, 228.  
Locomotive, The Reciprocating Parts of a, 198, 251.  
Locomotive, Von Borries' Compound, 236.  
Locomotive Works, Compound Mogul Freight Engine Built by the Pittsburgh, 71.  
Lorrey Car, 445.  
  
Maxim's Flying Machine, Mr., 405.  
Merritt's Wave Motor, 574.  
Metal Underframes for Freight Cars, 90.  
Metallic Packing, 404.

Midland Railway, Express Passenger Locomotive for the, 361.  
Military Ballooning in Germany, 599.  
Moffet Portable Drill, The, 282.  
Mosher Water-Tube Boiler, 427.  
Muffled Pop Valve, Standard, 33.  
  
"New York," Air-Pumps on the United States Cruiser, 96.  
New York, New Haven & Hartford Railroad, Pneumatic Hoist in the Shops of the, 82.  
"New York," United States Armored Cruiser, 21.  
New 999, A, 352.  
Norwalk Compound Air Compressor, The, 76.  
  
Oil from Oil Barrels to Tanks in Oil House, Arrangements for Transferring, 327.  
  
Packing, Cole's Metallic Rod, 571.  
Passenger Truck Drop Pit, 325.  
Philadelphia & Reading Railroad, Special Tools of the, 31, 124.  
Pipe Chuck for Lathe, 261.  
Piston-Packing Rings, Dunbar's, 134.  
Pit Jack for Wheel Pit, 325.  
Pittsburgh Locomotive Works, Compound Mogul Freight Engine Built by the, 71.  
Plow for Clearing Cinder Pits, 445.  
Plummer's Smokeless Boiler, 238.  
Pneumatic Dynamite Guns, The, 395.  
Pneumatic Hammer, Béché's, 572.  
Pneumatic Hose Machine for Applying Hose Couplings, 328.  
Pneumatic Hoist, 31.  
Pneumatic Hoist in the Shops of the New York, New Haven & Hartford Railroad, 81.  
Pneumatic Jack, 13-inch, 328.  
Pole and Rope Construction Staging, 418.  
Poling Car, N. Y., Lake Erie & Western Railroad, 514.  
Power Hammer, Beaudry's, 572.  
Pressed Steel Underframes, 261.  
Pressure Regulator, Gold's, 239.  
Progress in Flying Machines, 34.  
Projectile and Gear Presses, 87.  
Projectile Trimming Machine, 78.  
Pull-Down Jack for Removing Car Sills, Needle Beams, and Bolsters, 329.  
Pulleys, Dimensions of Cast-Iron, 135.  
Pulleys (Double Arms), Dimensions of Cast-Iron, 256.  
Pump and Tank for Filling Oilers, 447.  
Pumps of the United States Battleship "Texas," Boilers and Feed, 204.  
Punching Press, Long's Improved, 498.  
  
Quadruple-Expansion Engine for Third-Class Torpedo-Boat, 456, 457.  
Quick Speed Steam-Engine, 383.  
  
Rail Joint, Balch's, 141.  
Railway Construction in Japan, 365.  
Rapid-Fire Guns, The Driggs-Schroeder, 37.  
Rapid Loading of Coal into Ships, Apparatus for, 46, 112.  
Reciprocating Parts of a Locomotive, The, 198, 251.  
Relief Valve, The Knowles Automatic Exhaust, 426.  
Richmond Compound Locomotive, 305.  
Riehle Measuring and Per Cent. Gauge, 141.  
Root Boiler, The Improved, 523, 524.  
  
Safety Vent, Baker's, 303.  
Salveter's Metal Draft-Sill for Cars, 142.  
"Samson" Locomotive, 131.  
Serve Tubes, 491.  
Shipbuilders, Academy and Home for, 276.  
Siberian Railroad, Progress in the Construction of the Great, 541.  
Signal Apparatus in Use on the Grand Central Railway of Belgium, 161, 209.  
Smoke-Box, Cromwell's, 84.  
Special Appliances in Use on the Flint & Pèrre Marquette Railroad, Some, 404.  
Special Tools of the Philadelphia & Reading Railroad, 31, 124.  
Starting Appliance for Compound Engines, Wightman's, 431.  
Stations on the Central Railroad of New Jersey, Suburban, 124.  
Stay-Bolt Cutter in the Philadelphia & Reading Shops, 561.

Steam-Engine, Porter's, 382, 383.  
Steam-Engine, Sparr's, 383.  
Steam Hose, Arrangement of, 473.  
Steam Steering Gear, 214.  
Steamers, The Vibrations of, 257.  
Stoker, Butman's Mechanical, 570.  
Stoker, Hannan's Coal, 571.  
Stone-Breaking Machine for Road-Making, A New, 190.  
Suburban Locomotive for the Central Railway of Brazil, 509.  
Suburban Stations on the Central Railroad of New Jersey, 124.  
Suspension Railway at Knoxville, 283.  
Symonds' Dredging Bucket, 238.  
  
Tank Engine, 228.  
Telescope Jack for Wheel Pit, 325.  
Testing Machines, 217.  
Testing Machine, Hydrostatic, 327.  
Testing Machine, Recent Improvements in the Emery, 177.  
"Texas," Boilers and Feed Pumps of the United States Battleship, 204.  
"Texas," The Battleship, 102.  
"Texas," Triple-Expansion Engines of the United States Battleship, 353.  
"Texas," Turret and Turret-Moving Machinery of the United States Battleship, 152.  
Three-Cylinder Engine, 125.  
Thurman Fuel Oil Burner, The, 428.  
Ticket-Destroying Machine, 124.  
Tool Holder for Slotter, 446.  
Torpedo-Boat from Toulon to Cherbourg, Transportation of a, 308.  
Tower Coupler, The, 526.  
Train Heating with Steam and Compressed Air on the Eastern Railway of France, 373.  
Transmission of Power, with an Analysis of Compound Air Compressors, 368.  
Transportation of a Torpedo-Boat from Toulon to Cherbourg, 308.  
Transporting Buildings, 118.  
Traveling Crane, The Brown, 409.  
Trimming Machine, Projectile, 78.  
Trimming Press for Drop Forgings, 192.  
Triple-Expansion Engine for Tug "W. G. Wilmot," 315.  
Triple-Expansion Engines of the United States Battleship "Texas," 353.  
Truck Jack, Shop, 325.  
Truesdell's Compound Oscillating Engine, 239.  
Turret and Turret-Moving Machinery of the United States Battleship "Texas," 152.  
  
Underframes, Pressed Steel, 261.  
United States Armored Cruiser "New York," 21.  
United States Battleship "Texas," Boilers and Feed-Pumps of the, 204.  
United States Cruiser "Cincinnati," 442.  
  
Valve, Balanced, Fall Brook Coal Co., 490.  
Valve, Fay's Engine, 191.  
Valve Gear, Bagueley's, 553.  
Vibrations of Steamers, The, 257.  
Von Borries' Compound Locomotive, 236.  
  
Warren's Shifting Link, 572.  
Water-Tank, Automatic, 303.  
Water-Tube Boiler, Finlayson, 568.  
Water-Tube Boiler, Mosher, 427.  
Water-Tube Boiler, The Adams' Upright, 228.  
Water-Tube Boilers, The Influence of Circulation on Evaporative Efficiency of, 410.  
Water-Tube Boiler, Wood's, 300.  
Water-Tube Boilers, 399.  
Water-Tube Boilers and their Application to War Vessels, 547.  
Wave Motor, Merritt's, 574.  
Weldless Chains, Method of Manufacturing, 20.  
West Shore Railroad, The Use of Compressed Air, 350.  
Wightman's Starting Appliance for Compound Engines, 431.  
Wilmot, "Triple-Expansion Engine for Tug "W. G., 315.  
Wood's Water-Tube Boiler, 300.  
Worthington's Sectional Steam Boiler, 570.  
Wrench, Humphrey's, 240.  
  
Yarrow Boiler, The, 274.

## EDITORIALS.

Accidents to Locomotive Engineers and Firemen, 385.  
Accidents to the Paris, 97.  
After the Battle, 337.  
American Society of Mechanical Engineers, 193.  
Announcement, 433.  
Armament, Naval and Coast Defense, 1.  
  
Baker & Company, Messrs., 485.  
Bolt and Nut Machinery, Illustrated Catalogue of, 486.  
Brake-Shoes, 241.  
Brazilian Rebellion, 193.

Car Couplers, 433.  
Car, Iron, 49.  
Carpenter Shells at Indian Head, 289.  
Cars, Iron, 241.  
Coefficient of Friction, 145.  
Compound Locomotive, 97, 385.  
Compressed Air and Hydraulic Machinery, 145.  
Conventions of the Master Car Builders' and Master Mechanics' Associations, 49.  
Conventions, The Coming, 241.  
1895, 531.  
  
Electrical Distribution of Power, 433.

Electric Headlight for Locomotives, 1.  
Electricity on the Erie Canal, 1.  
Electric Lighting Plants, their Cost and Operation, 485.  
Electric Power, 485.  
  
Fastest Vessels in the World, 337.  
Fire Hose, Illustrated Catalogue and Price List, 485.  
Fuel Consumption of Locomotives be Diminished? How Can, 532.  
  
Headlight for Locomotives, Electric, 1.

Instability of Warships, 49.  
Intellectual Elasticity of an Average Audience,  
The Limit of, 97.  
"Interurban Roads," 385.  
Iron Cars, 49, 241.

Liability of Railroads for Damages, 385.  
Limit of Intellectual Elasticity of an Average Audience, The, 97.  
Locomotive, Compound, 97.  
Locomotive Engineers, 433.  
Longitudinal Bulkheads, 1.

Master Car Builders' and Master Mechanics' Associations, Conventions of the, 49.  
Master Car Builders' Association Standards, 337.

Master Mechanics' Associations, Conventions of the Master Car Builders' and, 49.  
Master Mechanics' Association, The Proceedings of the, 434.

Naval and Coast Defense Armament, 1.  
Navies of the World, 193.  
Netheroy as a Fighter, 97.

Proceedings of the Master Mechanics' Association, The, 386.  
Professional Services, Compensation for, 531.

Ranking Line and Engineer Officers, 433.

St. Louis, The, 531.  
Sea Fights Conducted with Turreted Battleships, 385.

Secretaryship of the American Society of Civil Engineers, The, 3.

Secret of Soaring, The, 528.  
Ship Canal from the Lakes to the Sea, 385.  
Shoes, Brake, 241.  
Shortage of Cars, 483.  
Speed Premiums on War Vessels, 49.  
Steam User's Manual, Catalogue and, 486.

Torver, Tank and Tub Catalogue of the W. E. Caldwell Company, 486.

Vulcan Iron Works Company's Catalogue of Steam Shovels and Steam Dredgers, The, 486.

Warships, Instability of, 49.  
War Vessels, Speed Premiums on, 49.  
Wheel and Gauge Standards, 337.

## NEW PUBLICATIONS.

Addresses Delivered before the World's Railway Commerce Congress, 4.

Aerated Fuel Process of Burning Oil, The, 346.

Aerial Navigation, 388, 481, 535.

Aerial Navigation, Notes on, 481.

Aerial Navigation, The Development of, 48.

Aerodynamic System of Transportation, The, 291.

Aéronaute, L', 481.

Aeronautical Engineering Materials, 481.

After the Fair, 101.

Album and Catalogue of the Société Suisse Pour la Construction de Locomotives et de Machines, 6.

American Fuel Economizer, The, 148.

American Institute of Mining Engineers, Transactions of the, 390.

American Railway Master Mechanics' Association, Report of the Proceedings of the Twenty-Seventh Annual Convention, 390.

American Tube Works, 243, 345.

Analysis of the Functions of a Bird's Wing, 530.

Animal as a Machine and a Prime Motor, The, 345.

Annual Report of the State Geologist of the State of New Jersey, 7.

Anti-Friction, or Babbitt Metal, 195.

Apparatus, Catalogue of, 536.

Asphaltum in 1893, 344.

Atlantic Coast Line, The, 482.

Auto-Pneumatic Railway Signal Company's Descriptive Catalogue of their Low-Pressure Pneumatic Interlocking Signals, 244.

Baker Car Heaters, Full Information for the Erection and Use of the, 196.

Ball Balanced Compound Locomotive, 101.

Beaman & Smith's Catalogue B, 291.

Beeson's Inland Main Directory, 243.

Bell's Improved Steam Hammers, 535.

Bement & Co., Manufacturers of Feed Pump Governors and Automatic Feed-Water Regulators, Chicago, 389.

Bliss Company, The E. W., 482.

Block Signaling and Interlocking, 438.

Bloomsburg Car Company, 146.

Board of Mediation and Arbitration of the State of New York, Sixth Annual Report of the, 102.

Boston Belting Co., 346.

Brakes upon Railway Trains, The Effect of, 344.

Brick for Street Pavements, 345.

Bridgeport Machine Works, The, 482.

British Railways, 6.

Brown & Sharpe Manufacturing Company's Cutters, 535.

Buckeye Automatic Car Coupler Company, The, 53.

Bureau of Construction and Repairs, Annual Report of the Chief of the, 535.

Bureau of the American Republics, 53, 102.

Bureau of Steam Engineering, Annual Report of the, 535.

Canal Connecting the North Sea and the Baltic, 483.

Car Interchange Manual, The, 387.

Car Painting, Catechism of, 535.

Car Steps, 483.

Caswell Hot-Water Circulator, The, 8.

Central Station Book-keeping and Suggested Forms, 535.

Centrifugal Pumping Machinery, Descriptive Circular and Price List of, 148.

Centrifugal Pumps, 534.

Charter Gas-Engine Company, The, 195.

Charter Gas-Engine, The, 148.

Chase-Kirchner Aerodynamic System of Transportation, The, 195.

Chicago Strike, Report of the, 535.

Cincinnati Southern Railway, The, 50.

Clayton Air Compressors and Air Receivers, 291.

Coast Defense, Our Share in, 102, 345.

Comparison of English and American Locomotives in the Argentine Republic, 7.

Compound Locomotives, 6, 438, 483.

Compressed Air, The Widening Use of, 8.

Concrete or Monolithic Construction, 243.

Connorsville Blower Company, Connorsville, Ind., The, 244.

Consolidated Car-Heating Company of Albany, N. Y., The, 162, 482.

Consular Reports, 102.

Corliss Engine, The, 5.

Correspondence School of Mechanics, The, 53.

Country Roads, 345.

Cranes, Steam, Hydraulic and Other, 535.

Dayton Railway Crossing-Gate, The, 245.

Detrick & Harvey Machine Co., The, 101.

Diameter, Accurate Tables of, 535.

Diseases of the Air-Brake System, their Causes, Symptoms and Cure, 388.

Dynamo and Motor Building for Amateurs, 101.

Earthenware Houses, 244.

Electricity One Hundred Years Ago and To-Day, 345.

Electricity up to Date for Light, Power, and Traction, 53.

Electricity, What an Engineer Should Know about, 100.

Electric Transmission of Intelligence and other Advanced Primers of Electricity, The, 53.

Electric Vises, Jack Screws, etc., New Illustrated Price List of Patent, 243.

Electric World, The, 51.

Elementary Principles of Mechanics, 535.

Elementary Treatise on the Steam Engine, An, 101.

Eleventh Annual Report of the Board of Railroad Commissioners of the State of New York for the Year 1893, 53.

Empire of the Air, The, 481.

Encyclopædia of Foundry and Dictionary of Foundry Terms used in the Practice of Molding, The, 344.

Engine, An Elementary Treatise on the Steam, 101.

Engineering Construction in Iron, Steel and Timber, 438.

Engineering Education, 102.

Engineering Magazine, 533.

Engines and Boilers, How to Run, 243.

Evolution of a Flying Machine, The, 530.

Exhibit of the Pennsylvania Railroad Company at the World's Columbian Exposition, Catalogue of the, 533.

Fibre, Graphite Bushings for Hangers, Pillow Blocks, Loose Pulleys, etc., 53.

Field Book for Civil Engineers, A, 4.

First Steam Screw Propeller Boats to Navigate the Waters of any Country, The, 5.

Flying Apparatus, 530.

Flying Man, The, 481.

Flying, New Lights on the Problem of, 481.

Flying, The Prospects of, 481.

Foreign Commerce and Navigation of the United States for the Year ending June 30, 1893, The, 102.

Foster Engineering Company, The, 482.

Fuel, Modern Methods of Handling, 535.

Geological Survey, Maps of the United States, 52.

George F. Blake Manufacturing Company, The, 482.

Gliding Flight, 481.

Globe Special Castings for Water-Works, 148.

Goldthwaite's Geographical Magazine, 4.

Graphite as a Lubricant, 148.

Gurley Souvenir Catalogue, World's Columbian Exposition, W. & L. E., 244.

Hand-Book of Information of the Rensselaer Polytechnic Institute, 4.

Hand-Power Traveling Cranes, 195.

Hazleton or Porcupine Boiler, Reports of Twenty-four Trials of the, 243.

Heald & Sisco, Centrifugal Pumping Machinery, 195.

Heaters, 438.

Heat Motor, Theory and Construction of a Rational, 439.

Helical Gears, 100.

Hinckley Automatic Brake Slack Adjuster, 148.

History of a Lead-Pencil, The, 102.

Horizontal and Vertical Steam Engines and Steel Boilers, New Pamphlet of High-Grade, 387.

Horizontal Water-Wheel, 148.

Howden's Hot-Draft System, 535.

Hyatt Roller Bearing Company, 102, 438.

Hydraulic Cement, Notes on the Testing and Use of, 51.

Hydraulic Testing Machines, 100.

Ide and Ideal Engines, Simple and Compound, Harrisburg, 291.

Immigration and Passenger Movement at Ports of the United States during the Year ending June 30, 1893, 102.

Imperial University of Japan, 4.

Index to Technical Journals, 533.

Interlocking and Signaling Apparatus, Reference Catalogue Giving Detailed Plans, Illustrations and Descriptive List of, 536.

International Maritime Congress, 5.

Iron Car Company, The, 244.

Iron Founder Supplement, The, 52.

Johnson Railway Signal Company, 536.

Journal of the American Society of Naval Engineers, 7.

Knowles' Special Catalogue of Power Pumps, 101.

Lachine Canal, Deepening of the, 483.

La Machine Locomotive, 343.

Lathes and Other Machine Tools, Illustrated Catalogue of, 148.

Lead-Pencil, The History of a, 102.

Link-Belt Machinery Co., The, 53.

Locomotives, Compound, 6.

Locomotive, Construction of the Modern, 534.

Locomotive Mechanism and Engineering, 147.

Locomotive Works, Through, 533.

Ludlow Coupler Company, 389.

Lunkenheimer Company, The, 101, 535.

Machinery, 436.

Machine Tools for the Rapid Production of Lathe Work, 195.

Magneto Hand Telephone, its Construction, Fitting Up and Adaptability to Every-Day Use, The, 245.

Magnolia Metal Co., The, 101.

Man Flight near at Hand, 481.

Manual of the Railroads of the United States for 1894, 390.

Marsh Steam Pump, The, 291.

Massachusetts, Twenty-fifth Annual Report of the Railroad Commissioners of the State of, 345.

Master Car Builders' Association, Report of the Proceedings of the Twenty-eighth Annual Convention of the, 437.

Maxim Flying Machine, The, 530.

Maxim's Triumph and Disaster, 530.

Maximum Stresses in Drawbridges, Having Two Equal Arms, 290.

Maydole Hammers, 535.

McSherry Manufacturing Company, The, 346.

Measurement and Division of Water, 535.

Measuring Instruments for all Trades and Scientific Purposes, Catalogue and Price-List of Modern, 243.

Mechanics of Hoisting Machinery, The, 4.

Men with Finished Minds, 483.

Modern Turret Lathe Practice, 438.

National Car and Locomotive Builder, 100.

National Geographic Magazine, January 31, 1894.

Proceedings of the International Geographic Conference in Chicago, July 27, 28, 1893, The, 102.

National School of Electricity, The, 345.

Navigation, Primer of, 245.

New Era Gas and Gasoline Engines, The, 291.

New Roads and Road Laws in the United States, 390, 436.



## NEW PUBLICATIONS.

V

New York, Eleventh Annual Report of the Board of Railroad Commissioners of the State of, 345.  
New York, New Atlas of the State of, 52.

Oriental Republic of Uruguay at the World's Columbian Exhibition, The, 7.

Peck's Export Purchase Index, 195.  
Performances of the Steel Steamer, 536.  
Per 1 Mercati Coperti, 7.  
Pintch Gas in Houston, Texas, 482.  
Pocket Primer of Air-Brake Instruction, 388.  
Political Economy of Natural Law, The, 102.  
Poor's Directory of Railway Officials, 5.  
"Practical Engineer" Pocket-Book and Diary, The, 146.  
Practical Flight, 481.  
Practical Instructions Relating to the Construction and Use of the Steam Engine Indicator, 5.  
Problem of Man Flight, The, 481.  
Proceedings of the Twenty-fourth Annual Convention of the Master Car and Locomotive Painters' Association of the United States and Canada, 7.  
Public Works and Mines, and the Traditions and Superstitions of all Countries, 343.  
Pumps, Centrifugal, 534.

Railroad Car Journal, 111.  
Railroad Commissioners of the State of Massachusetts, Twenty-fifth Annual Report of the, 345.  
Railroad Commissioners of the State of New York, Eleventh Annual Report of the Board of, 345.  
Railway Master Mechanic, The, 4.  
Red Lead, Concerning, 346.  
Revue de l'Aéronautique, 481.  
Roads and Pavements, A Text-Book on, 437.  
Robins' Life Guard or Safety Tender for Electric and Cable Cars, The, 8.  
Roofs and Bridges, A Text-Book on, 439.

Rope Driving, Practical Notes on, 535.  
Rue Manufacturing Company, The, 243.

Santo Domingo, 390.  
Scientific Problems of the Future, 481.  
Seventh Annual Report of the Interstate Commerce Commission, 53.  
Sewage Disposal, Discussion of the Prevailing Theories and Practices Relating to, 535.  
Skinner Patent Chucks, 345.  
Southern Facts for Home-Seekers and Travelers, 244.  
Standard Water-Tube Safety Boilers, 7.  
Steam Engine and Other Heat Engines, The, 344.  
Steam Engine, A Practical Treatise on the, 147.  
Steam Hammers, Bell's Improved, 535.  
Steam Heating Systems, Baker Heater and Pintch Gas, Rules for Operation of, 102.  
Steam Machinery and the Marine Steam Engine, Elementary Lessons in, 52.  
Street Railway Journal, The, 485.  
Stresses in Girder and Roof Trusses, 439.  
Surveying and Surveying Instruments, 195.  
Surveying Instruments and Drawing Materials, Architects' and Civil Engineers' Supplies, Catalogue and Price List of, 349.  
Sweet's Patent Measuring Machines, Price List of, Professor, 345.

Tanite Company, The, 486.  
Tariff of United States Customs Duties, R. F. Downing & Company's, 535.  
Text-Book on Roads and Pavements, 390.  
Thousand-Mile Ride on the Engine of the Swiftest Train in the World, A, 51.  
Thurman Fuel Oil Burner Company's System of Burning Crude Petroleum, 535.  
Tie Plates a Track Repairs, The Value of, 346.  
Tradesman, The, 51.  
Transactions of the American Institute of Electrical Engineers, 245.

Transition Curves, 535.  
Transition Curve, The, 4.  
Transportation Exhibits at the World's Columbian Exposition of 1893, 436.  
Treatise on the South American Railways and the Great International Lines, 7.  
Turret Lathe, The 2x24 Flat, 8.  
Turret Lathe Practice, Modern, 346.

United States Metallic Packing Company, 53.  
Universal Cutter and Tool Grinder, New, 8.  
Universal Index to the World's Technical and Scientific Literature, 383.

Valentine & Company, 53.  
Venture Meter, The, 8.

Water or Hydraulic Motors, 390, 437.  
Water-Tube Boilers, A Few Plain Facts Concerning, 348.  
Weather-Making, Ancient and Modern, 345.  
Westinghouse Automatic Brake Catalogue, The, 196.  
Westinghouse Single-Acting Engines, Compound, Standard, and Junior, The, 8.  
Weston Engines, 291.  
What an Engineer Should Know about Electricity, 100.  
Wheeler's Improved Surface Condensers, 101.  
White's Reference Book of Railroad Securities, 390.  
Will Man Ever Fly? 530.

Young & Willer Automatic Mechanical Railroad Block-Signal Company, The, 101.  
Youngstown Bridge Company, The, 482.

Zeitschrift für Luftschiffahrt und Physik der Atmosphäre, 481.

## MISCELLANEOUS ARTICLES.

Academy and Home for Shipbuilders, 276.  
Accidents to Locomotive Engineers and Firemen, 39, 89, 135, 189, 229, 277, 331, 377, 423, 469, 521, 545.  
Acme Nut-Facing Machine, 526.  
Adams' Upright Water-Tube Boilers, The, 228.  
"Admiral Seniavin," The New Russian Armored Ship, 512.  
Aerial Navigation, The Development of, 479.  
Air Brake and Hand Brake, 324.  
Air Compressor, The Norwalk Compound, 76.  
Air Compressors' Transmission of Power, with an Analysis of Compound, 368.  
Air Duster, 5-in., 328.  
Air Duster Nozzle, Chicago, Rock Island & Pacific, 327.  
Air Duster Nozzle, Cleveland, Cincinnati, Chicago & St. Louis Railway, 326.  
Air-Hoist Crane, Car with, 496.  
Air Hoist for Loading Wheels and Axles, 327.  
Air Hose Fittings, Machine for Applying, 326.  
Air Pumps on the United States Cruiser "New York," 96.  
Air, The Scientific Uses of Liquid, 132.  
Aluminum Drawing Instruments, 236.  
Aluminum, The Manufacture of, 245.  
American and English Locomotives, 9, 63.  
American Locomotives in the Argentine Republic, Comparison of English and, 74.  
American Railway Master Mechanics' Association, Convention of the, 291.  
American Society of Civil Engineers', The Secretaryships of the, 3.  
American Society of Mechanical Engineers', Meeting of Members of the, 49, 78, 100, 177, 217.  
Among the Shops at Corning, N. Y., 495.  
Among the Shops at Hornellsville, N. Y., 444.  
Among the Shops at Packerton, Pa., 497.  
Analysis of Iron and Steel, International Standards for the, 140, 196.  
Arbitration, A Successful, 407.  
Apparatus for Rapid Loading of Coal into Ships, 67, 112.  
Argentine Republic, Comparison of English and American Locomotives in the, 74.  
Armor, Recent Experiments in, 334.  
Atwood & Perkins' Engine, 239.  
Automatic Coupler Standards, 331.  
Automatic Water Tank, 303.  
Auxiliary Machinery of a Modern Cruiser, The, 450.

Bagueley's Valve Gear, 553.  
Balloon at the Antwerp Exhibition, Navigable, 477.  
Balloons, Making, 578.  
Balloon Struck by Lightning, A War, 477.  
Baker's Safety Vent, 303.  
Baker, William C., 333.  
Baldwin Locomotive Works, Boilers and Boiler-Room at the, 215.

Ball & Wood Company's New Vertical Engine of 600 H. P., 235.  
Band Resawing Machine, 568.  
Battleship "Royal Oak," The First-Class, 83.  
Battleship "Texas," The, 103.  
Beaudry's Power Hammer, 572.  
Beaumont-Wallington High-Speed Engine, The, 422.  
Béché's Pneumatic Hammer, 572.  
Belpaire Boilers on the Lehigh Valley Railroad, 346.  
Bethlehem Iron Company at the World's Fair, The Exhibit of the, 175.  
Blower, Green's Rotary, 238.  
Boiler Locomotive for the Belgian State Railway, Triple, 273.  
Boiler, Plummer's Smokeless, 238.  
Boilers and Boiler-Room at the Baldwin Locomotive Works, 215.  
Boilers and Feed Pumps of the United States Battleship "Texas," 204.  
Boilers in the Navy, The Use of Water-Tube, 266.  
Boiler on the Lehigh Valley Railroad, Belpaire, 346.  
Boiler Steel, Specifications for, 293.  
Boilers, The Adams' Upright Water-Tube, 228.  
Boiler, The Yarrow, 274.  
Boilers, Water-Tube, 193, 392.  
Boiler, Wood's Water-Tube, 300.  
Boiler, Worthington's Sectional Steam, 570.  
Bow Fire of Modern Ships, The, 553.  
Brakes, Freight-Car, 324.  
Brake Shoes, Tests of, 323.  
Bridge on Duluth, Missabe & Northern Railway, 276.  
Brown's Bicyclette Electric Car, 511.  
Brown's Electric Railway Car, 475.  
Brown Traveling Crane, The, 409.  
Burlington-Crozier Disappearing Gun Carriage, The, 59.  
Buildings, Transporting, 118.  
Butman's Mechanical Stoker, 570.

Capital Vises and Jack Screws, 336.  
Car, Defensive Railroad, 287.  
Carrier for Wheel Lathe, 124.  
Cars, Metal Under Frames for Freight, 90.  
Cast-Iron Pulleys (Double Arms), Dimensions of, 256.  
Catalogues, Specifications, etc., Standard Sizes for, 322.  
Caucasus Range, The Government New Location for the Railroad across the Main, 28.  
Central Railroad of New Jersey, Suburban Stations on the, 124.  
Centrifugal Pumps, 411, 499, 461.  
Chains, Method of Manufacturing Weldless, 20.  
Chains, Safety, 322.  
Chase & Company, L. C., 332.  
Check Valve, 288.

Chemnitz, Industries of, 54.  
Chinese Railroads, 513.  
Cinder Trap, 405.  
Circulation on Evaporative Efficiency of Water-Tube Boilers, The Influence of, 410.  
Coal Consumption, Empire State Express, 423.  
Coal into Ships, Apparatus for Rapid Loading of, 67, 112.  
Coal, Prices of Nova Scotia, 134.  
Coal-Washing Plant, The Lubrig, 119.  
Cole's Metallic Rod Packing, 571.  
"Columbia" and "Minneapolis," The United States Triple-Screw Cruisers, 542.  
Compound Air Compressors, Transmission of Power, with an Analysis of, 368.  
Compound Engines, 1.  
Compound Engines, Wightman's Starting Appliance for, 431.  
Compound Locomotive, 295.  
Compound Locomotive on the Long Island Railroad, Performance of a, 137.  
Compound Locomotive, Richmond, 305.  
Compound Locomotives, Saving Effect by, 103.  
Compound Mogul Freight Engine Built by the Pittsburgh Locomotive Works, 71.  
Compressed Air Appliances and Hydraulic Machinery, 324.  
Compressed Air in Paris, The Distribution of, 466.  
Compressed Air on the West Shore Railroad, The Use of, 350.  
Consolidated Car Heating Company, The, 333.  
Contributions to Practical Railroad Information, 519.  
Contributions to Practical Railroad Information, Manganese in Steel, Method of Determining, 176, 128, 321, 378, 449.  
Convention of the American Railway Master Mechanics' Association, 291.  
Conventions of the Master Car Builders' and Master Mechanics' Associations, The, 289.  
Copper and Lead in Phosphor-Bronze, Method of Determining, 449.  
Coupler Standards, Automatic, 331.  
Cracking of Back Tube Sheets, 291.  
Cracks in Fire-Box Sheets, 127.  
Crane, A 40-Ton Dock, 483.  
Crane at Her Majesty's Dock Yard, Chatham, 160-Ton, 164.  
Crane, One-Ton Traveling, 31.  
Crank's Turnings, The, 527.  
Criticism from Headquarters, A, 50.  
Cromwell's Smoke-Box, 84.  
Crosby Steam Gauge and Valve Company, 333.

De Laval's Steam Turbine, 381.  
Delaware & Hudson Canal Company, Standard Mogul Freight Locomotive of the, 259.  
Detentions on Railroads from Defects in Locomotives, 44.  
Detentions to Trains from Failures of Passenger Locomotives, 90, 139.

Development of Stationary Engines, The, 106.  
 Draft-Sill for Cars, Salveter's Metal, 142.  
 Draw Gear for Cars, Cole & Grievies, 144.  
 Drawing Instruments, Aluminium, 236.  
 Dredger, A Solid Rock, 192.  
 Dredging Bucket, Symonds', 238.  
 Driggs-Schroeder Rapid-Fire Guns, The, 37.  
 Drills, New Method of Driving, 235.  
 Drill, The Moffet Portable, 283.  
 Drop Pit, Passenger Truck, 325.  
 Duluth, Missabe & Northern Railway, Bridge on, 270.  
 Dunbar's Piston-Packing Rings, 134.\*

Editorial Perplexity, An, 53.  
 Electrical Energy in the Mills of Forrest & Co., at St. Etienne, Distribution of, 558.  
 Electrical Transmission of Power in Factories, 164.  
 Electricity, Economy of Driving Mills and Factories by, 449.  
 Electric Power Installations in Engineering and Iron Works, 265.  
 Electric Signalling without Wires, 272.  
 Emery Testing Machine, Recent Improvements in the, 177.  
 Engine, A Heavy Duty Slide Valve, 284.  
 Engine and Dynamo, Direct Connection, 335.  
 Engine, Atwood & Perkins', 230.  
 Engine Built by the Pittsburgh Locomotive Works, Compound Mogul Freight, 71.\*  
 Engine Clearance Condensation, Cylinder and Initial, 503.  
 Engine, Delaware & Hudson Canal Co., Standard Mogul Passenger, 298.  
 Engine 870 on the New York Central & Hudson River Railroad, Performance of, 197.  
 Engine for Tug "W. G. Wilmot," Triple-Expansion, 315.  
 Engine, The Beaumont-Wallington High-Speed Engine, 422.  
 Engine and Tender Connection on the Pennsylvania Railroad, 362.  
 Engineers and Firemen, Accidents to Locomotive, 39, 89, 135, 185, 229, 277, 331.  
 Engineer's Career Represented Graphically, An, 119.  
 Engines, Compound, 1.  
 Engines of the German Railway Union, Some, 307.  
 Engines of the United States Battleship "Texas," Triple-Expansion, 353.  
 Engines, The Development of Stationary, 106.  
 Engine, Tank, 228.  
 Engine, Three-Cylinder, 125.  
 Engine, Truesdell's Compound Oscillating, 239.  
 English Locomotives, American and, 9, 63.  
 English and American Locomotives in the Argentine Republic, Comparison of, 74.  
 Enigmas of Elements, The, 507.  
 Exhaust Nozzles, 296.  
 Exhibits at the Conventions, Some, 332.  
 Expansion of Locomotive Fire-Boxes, Experiments on the, 114.  
 Express Passenger Locomotive for the Midland Railway, 361.  
 Fay's Engine Valve, 191.  
 Finlayson Water-Tube Boiler, 568.  
 Fire-Boxes, Experiments on the Expansion of Locomotive, 114.\*  
 Fire-Box Sheets, Cracks in.  
 Fire-Box, Von Dormus' Locomotive, 287.  
 Fire Kindler for Kindling Locomotive Fires with Crude Oil instead of Wood, The Leslie Patent Locomotive, 304.  
 Fire Kindlers, Locomotive, 296.  
 Flexible Friction Clutch Pulley, 524.  
 Flight so Difficult of Invention? Why is Artificial, 575.  
 Flint & Pere Marquette Railroad, Locomotive for Local Traffic on the, 263.  
 Flying Machine, Mr. Maxim's, 405.  
 Fog Signaling Apparatus, A New, 255.  
 Free Labor and Trade Unionism, 551.  
 Free Labor Association, Manifesto of the, 551.  
 Freight Car Brakes, 324.  
 French Spring Company, The A—, 333.  
 Fuel Oil Burner, The Thurman, 428.  
 Fuel on the French, English and Belgium Railways, The Handling of, 13.\*  
 Fuels, Liquid, 318.  
 Furnace and Mechanical Stoker, Butman's, 570.

Gas Motors for Street Railways, Progress in, 455.  
 Gas Motors in Germany, The Use of, 119.  
 Gas Power on Tramways, 364.  
 Gear Presses, Projectile and, 87.  
 George IV., Railroad under the Reign of, 122.  
 German Railway Union, Some Engines of the, 307.  
 Gettysburg to Baltimore, Electric Railroad from, 465.  
 Glass Oil Cup for Dynamos and General Engine Bearings, A, 48.  
 Gold's Pressure Regulator, 239.  
 Gölsdorf's Compound Locomotive, 573.  
 Government New Location for the Railroad across the Main Caucasus Range, The, 28.  
 Grand Central Railway of Belgium, Signal Apparatus in Use on the, 209.  
 Grand Trunk Railway Injector, 27.

Graphically, An Engineer's Career Represented, 119.  
 Graphite as a Lubricant, 242.  
 Graphite Paint, L. S. G., 284.  
 Graphite, Testing, 390.  
 Green's Rotary Blower, 238.  
 Grindstone Truing Device, 33.\*

Hancock Locomotive Inspirator for 1894, The, 474.  
 Hand Brake, Air Brake and, 324.  
 Hannan's Coal Stoker, 571.  
 Heating Power of Smoke, The, 468.  
 Heating, Steam, 324.  
 Heavy-Duty Slide Valve Engine, A, 284.  
 Helmholtz's Locomotive Running Gear, 236.  
 High-Speed Locomotives, 145.  
 Hoist for Loading and Unloading Cars, 325.  
 Hoist for Loading Wheels and Axles, 327.  
 Horizontal Drilling Attachment, 31.  
 "Hornet," Trials of H. M. S., 260.  
 Hose Connections, Plan for Applying, 327.  
 Humphreys' Wrench, 240.  
 Hunt's Journal Bearing, 142.  
 Hydraulic Boat Lifts, 211.  
 Hydraulic Machinery, Compressed Air Appliances and, 324.  
 Hydraulic Screw Press, 496.  
 Hydrostatic Testing Machine, 327.

Inclined Planes on the Morris Canal, 555.  
 Indelible Pencils, 322.  
 Injector, Grand Trunk Railway, 27.  
 Interchange, Rules of, 323.  
 International Standards for the Analysis of Iron and Steel, 140, 196.  
 Iron and Steel Wire, 171.  
 Iron in Commercial Spelter, Methods of Determining, 519.  
 Jack, 13-in., Pneumatic, 328.  
 Jack, Shop Truck, 325.  
 Jacket Punch Machine, 33.  
 Japan, Railway Construction in, 365.  
 Japanese Bridge, An Old, 507.  
 Journal Bearing, Hunt's, 142.

Kingsland Shops of the Delaware, Lackawanna & Western Railroad Company, The, 33.  
 Kinsman Block System Company, 275, 333.  
 Klein & Linder Locomotive, The, 487.  
 Knowles' Automatic Exhaust Relief Valve, The, 426.

Labor Question, The, 517.  
 Labor, Supplementary Observations of the Royal Commission on, 341.  
 Lehigh Valley Railroad, Belpaire Boiler on the, 346.

Lifeboats, Steam, 227.  
 Lifts, Hydraulic Boat, 21.  
 Lighting Passenger Car Equipment, 331.  
 Link, Warren's Shifting, 572.  
 Liquid Air, The Scientific Uses of, 132.  
 Loading of Coal into Ships, Apparatus for Rapid, 67, 112.

Locomotive, Compound, 205.  
 Locomotive, Delaware & Hudson Canal Company, Standard Mogul Passenger, 298.

Locomotive Engine, 143.  
 Locomotive Engine 870, on the New York Central & Hudson River Railroad, Performance of, 197.  
 Locomotive Engineers and Firemen, Accidents to, 39, 89, 135, 185, 229, 277, 331, 377, 423, 469, 521, 545.

Locomotive Fire-Boxes, Experiments on the Expansion of, 39, 89, 114, 135, 185, 229, 277, 331, 377.  
 Locomotive Fire-Box, Von Dormus', 287.  
 Locomotive Fire Kindler for Kindling Locomotive Fires with Crude Oil instead of Wood, The Leslie Patent, 296, 304.

Locomotive for Local Traffic on the Flint & Pere Marquette Railroad, 263.  
 Locomotive for the Belgian State Railway, Triple Boiler, 273.

Locomotive for the Midland Railway, Express Passenger, 361.  
 Locomotive, Four-Wheeled Coupled Bogie Tank, 169.

Locomotive, Gölsdorf's Compound, 573.  
 Locomotive, Helmholtz, 286.  
 Locomotive History, 390.

Locomotive, London & Northwestern Railway, Eight Wheels Coupled Compound (Webb's System) Coal, 515.  
 Locomotive of the Delaware & Hudson Canal Company, Standard Mogul Freight, 250.

Locomotive on the Long Island Railroad, Performance of a Compound, 137.  
 Locomotive Problem, The Last of the, 8, 55, 149.

Locomotive Returns for 1894, Monthly, 8, 40, 88, 136, 184, 230, 278, 330, 424, 470, 520, 544.  
 Locomotive Running Gear, Helmholtz's, 236.

Locomotive "Samson," 131.  
 Locomotive, Tank, 228.

Locomotive Tests, Conducting, 298.  
 Locomotive, The Reciprocating Parts of a, 198, 251.

Locomotives, American and English, 9, 63.  
 Locomotives as Compared with Stationary and Marine Engines, The Economical Efficiency of, 491.

Locomotives for Brazil, Two Types of, 508.  
 Locomotives for the Boston & Albany Railroad, Eight-Wheeled Passenger, 493.  
 Locomotives, Cost of Maintaining, 296.  
 Locomotives on the Manchester, Sheffield & Lincolnshire Railway, Standard, 405.  
 Locomotives, Use of Petroleum on Locomotives, 350.  
 Locomotives, Detentions to Trains from Failures of Passenger, 44, 90, 139.  
 Locomotives, High-Speed, 145.  
 Locomotives of the German Railway Union, Some, 307.  
 Locomotives in the Argentine Republic, Comparison of English and American, 74.  
 Locomotives, Modern, 54.  
 Locomotives, Saving Effected by Compound, 103.  
 Locomotives of the New York, Lake Erie & Western Railroad, 564.  
 Locomotive Valve Gear with Separate Admission and Exhaust Valves, 275.  
 Locomotive, Von Borries' Compound, 236.  
 Locomotive Works, Compound Mogul Freight Engine Built by the Pittsburgh, 71.\*  
 Lubrication of Cars, 323.  
 Lubrig Coal-Washing Plant, The, 119.

Machinery of the New Vessels of the United States Navy, Notes on the, 17.

Master Mechanics' Association, Convention of the American Railway, 291.

Master Mechanics' Associations, The Conventions of the Master Car Builders' and, 289, 321.

Maxim's Flying Machine, Mr., 405, 481.  
 Mechanical Engineers, Meetings of Members of the Society of, 97, 177.

Meeting of the Members of the American Society of Mechanical Engineers, The Use of Water-Tube Boilers in the Navy, 266.

Memorial Service, 331.  
 Merritt's Wave Motor, 574.

Metals from Rust, Protecting, 27.  
 Metal Under Frames for Freight Cars, 90.

Metallic Packing, 404.  
 Method of Determining Silicon in Steel, 34.

Midland Railway, Express Passenger Locomotive for the, 361.  
 Military Ballooning in Germany, 529.

Milling, A Lesson in, 569.  
 Modern Locomotives, 54.

Moffet Portable Drill, The, 283.  
 More Room Needed, 129.

Morton Safety Heating Company, The, 333.  
 Mosher Water-Tube Boiler, 427.

Motive Power Required for an Electric Railway, The, 367.  
 Motors in Germany, The Use of Gas, 119.

Muffled Pop Valve, Standard, 33.  
 New 999, A, 352.

New York, New Haven & Hartford Railroad, Pneumatic Hoist in the Shops of the, 82.  
 "New York," United States Armored Cruiser, 21, 96.

Norwalk Compound Air Compressor, The, 76.  
 Nova Scotia Coal, Prices of, 134.

Nozzles, Exhaust, 296.  
 Oils and Oil Tests, 292.

Pacific with the Arctic Ocean, A Connection of the, 511.  
 Packing, Cole's Metallic Rod, 571.

Page Woven-Wire Fence Company, 475.  
 Passenger Truck Drop Pit, 325.

Patent Bill, The New, 196.  
 Pencils, Indelible, 322.

Performance of Engine 870 on the New York Central & Hudson River Railroad, 197.  
 Petroleum in Java and Sumatra, 190.

Petroleum on Locomotives, The Use of, 350.  
 Philadelphia & Reading Railroad, Special Tools of the, 31, 124.

Philadelphia & Reading Railroad, Tender Frame, 53.  
 Phineas Davis' Steamboat, 42.

Phosphorus in Phosphor Bronze, Method of Determining, 128.  
 Photographic Process, A New, 183.

Pipe Chuck for Lathe, 261.  
 Piston Packing Rings, Dunbar's, 134.

Pit Jack for Wheel Pit, 325.  
 Pittsburgh Locomotive Works, Compound Mogul Freight Engine Built by the, 71.

Plummer's Smokeless Boiler, 238.  
 Pneumatic Dynamite Guns, The, 395.

Pneumatic Hammer, Béché's, 572.  
 Pneumatic Hoist in the Shops of the New York, New Haven & Hartford Railroad, 31.

Pneumatic Hose Machine for Applying Hose Couplings, 328.  
 Pneumatic Jack, 13-in., 328.

Pole and Rope Construction Staging, 418.  
 Poling Car, New York, Lake Erie & Western Railroad, 515.

Power Hammer, Beaudry's, 572.  
 Pressed Steel Under Frames, 261.

Pressure Regulator, Gold's, 239.  
 Problem, The Last of the Locomotive, 149.

Progress in Flying Machines, 34.  
 Projectile Trimming Machine, 78.



Projectile and Gear Presses, 87.  
Pull-Down Jack for Removing Car Sills, Needle Beams and Bolsters, 329.  
Pulleys, Dimensions of Cast-Iron, 135.  
Pulleys (Double Arms), Dimensions of Cast-Iron, 256.  
Pumps of the United States Battleship "Texas," Boilers and Feed, 304.  
Pump Valves, 125.  
Purdue University, Fire at, 140.

Quadruple-Expansion Engine for Third-Class Torpedo Boat, 457.  
Quick-Speed Steam Engine, 383.

Rack Railways, 361.  
Railroading under the Reign of George IV., 122.  
Railway Construction in Japan, 365.  
Railway Signal Question, The, 54.  
Ram in Action and in Accident, The, 212.  
Rapid-Fire Guns, The Driggs-Schroeder, 37.  
Rapid Loading of Coal into Ships, Apparatus for, 67, 112.  
Reciprocating Parts of a Locomotive, The, 198, 251.  
Relief Valve, The Knowles' Automatic Exhaust, 426.  
Résumé of Accidents to Locomotive Engineers and Firemen for One Year, 163.  
Re-rolling Street Rails, 486.  
Richmond Compound Locomotive, 305.  
Riehle Measuring and Per Cent. Gauge, 141.  
Riveting Pressures Required for Bridge and Boiler Work, The, 85.  
Root Boiler, The Improved, 523.  
Ross Valve Company, The, 333.  
Royal Commission on Labor, Supplementary Observations of the, 341.  
"Royal Oak," The First-Class Battleship, 83.  
Rules of Interchange, 323.  
Russian Commercial Fleet, The, 512.  
Russian Engineering Notes, 511.  
Rust, Protecting Metals from, 27.

Safety Car-Heating and Lighting Company, 333.  
Safety Chains, 322.  
Safety Vent, Baker's, 303.  
Sailing Flight of Aeroplanes, A Theory of, 530.  
Salveter's Metal Draft-Sill for Cars, 142.  
Sanding the Track, Methods of, 296.  
Saving Effected by Compound Locomotives, 103.  
Scarritt Furniture Company, 333.  
Serve Tubes Made on the Northern Railway of France, Experiments with, 285.  
Ship Builders, Academy and Home for, 276.  
Siberian Railroad, Progress in the Construction of the Great, 541.  
Signal Apparatus in Use on the Grand Central Railway of Belgium, 161, 209.  
Signaling without Wires, Electric, 272.  
Signal Question, The Railway, 54.  
Silicon in Steel, Method of Determining, 321.

Simonds' Rolling Machine Company, 333.  
Smoke-Box, Cromwell's, 84.  
Special Appliances in Use on the Flint & Pere Marquette Railroad, Some, 404.  
Special Shop Tools, 296.  
Standard Sizes for Catalogues, Specifications, 322.  
Standard Specifications for Structural Steel, 281.  
Starting Appliance for Compound Engines, Wightman's, 431.  
Stations on the Central Railroad of New Jersey, Suburban, 124.  
Staybolt Cutter in the Philadelphia and Reading Shops, 561.  
Steamboat, Phineas Davis', 42.  
Steam Engine, Porter's, 382.  
Steam Engines, Spair's, 383.  
Steamers, The Vibrations of, 257.  
Steam Heating, 324.  
Steam Hose, 473.  
Steam Life-Boats, 227.  
Steel, International Standards for the Analysis of Iron and, 140.  
Steel, Specifications for Boiler, 293.  
Steel, Standard Specifications for Structural, 281.  
Steel-Tired Wheels, 322.  
Steering Gear, Steam, 214.  
Stoker, Butman's Mechanical, 570.  
Stoker, Hannan's Coal, 571.  
Stone Breaking Machine for Road Making, A New, 190.  
Stone for Engineering Structures, Building, 186.  
Suburban Stations on the Central Railroad of New Jersey, 124.  
Suspension Railway at Knoxville, 283.  
Symonds' Dredging Bucket, 238.

Tank Engine, 228.  
Taylor Iron and Steel Company, 303.  
Telescope Jack for Wheel Pit, 325.  
Tender Frame, Philadelphia & Reading Railroad, 53.  
Testing Machine, Hydrostatic, 327.  
Testing Machine, Recent Improvements in the Emery, 177.  
Testing Machines, 217.  
"Texas," Boilers and Feed-Pumps of the United States Battleship, 204.  
"Texas," The Battleship, 103.  
"Texas," Triple-Expansion Engines of the United States Battleship, 353.  
"Texas," Turret and Turret Moving Machinery of the United States Battleship, 152.  
Three-Cylinder Engine, 125.  
Thurman Fuel Oil Burner, The, 428.  
Ticket-Destroying Machine, 124.  
Tin in Phosphor Bronze, Method of Determining, 372.  
Tire Treatment, 298.  
Torpedo-Boat from Toulon to Cherbourg, Transportation of a, 308.  
Tower Coupler, The, 525.  
Train Heating with Steam and Compressed Air on the Eastern Railway of France, 373.

Transmission of Power with an Analysis of Compound Air Compressors, 368.  
Transcaspian Railroad, The Proposed Extension of the, 511.  
Transportation of a Torpedo-Boat from Toulon to Cherbourg, 308.  
Transporting Buildings, 118.  
Traveling Crane, The Brown, 409.  
Trimming Machine, Projectile, 78.  
Trimming Press for Drop Forgings, 192.  
Triple-Expansion Engine for Tug "W. G. Wilmot," 315.  
Triple-Expansion Engines of the United States Battleship "Texas," 353.  
Truesdell's Compound Oscillating Engine, 239.  
Tubes Made on the Northern Railway of France, Experiments with Serve, 285.  
Tube Sheets, Cracking of Back, 291.  
Truck Jack, Shop, 325.

Under Frames, Pressed Steel, 261.  
United States Armored Cruiser "New York," 21.  
United States Battleship "Texas," Boilers and Feed-Pumps of the, 204.  
United States Cruiser "Cincinnati," 444.

Valve, Fay's Engine, 191.  
Valve Gear, Bagueley's, 553.  
Valve Gear with Separate Admission and Exhaust Valves, Locomotive, 275.  
Valve, Balanced, 496.  
Ventilation, Car, 324.  
Vibrations of Steamers, The, 257.  
Von Borries' Compound Locomotive, 236.

Warren's Shifting Link, 572.  
Water Tank, Automatic, 303.  
Water-Tube Boiler, Finlayson, 568.  
Water-Tube Boiler, Mosher, 427.  
Water-Tube Boilers, 191, 392.  
Water-Tube Boilers and their Application to War Vessels, 547.  
Water-Tube Boilers in the Navy, The Use of, 266.  
Water-Tube Boilers, The Adams' Upright, 228.  
Water-Tube Boilers, The Influence of Circulation on Evaporative Efficiency of, 410.  
Water-Tube Boiler, Wood's, 300.  
Wave Motor, Merritt's, 574.  
Weldless Chains, Method of Manufacturing, 20.  
Westinghouse Air-Brake Company, 333.  
Wheels, Steel-Tired, 322.  
White Sea, A New Connection, 511.  
Wightman's Starting Appliance for Compound Engines, 430.  
"Wilmot," Triple-Expansion Engine for Tug W. G., 315.  
Wire, Iron and Steel, 171.  
Wood, Unconsidered Uses of, 167.  
Worthington's Sectional Steam Boiler, 570.  
Wrench, Humphreys', 240.

Yarrow Boiler, The, 274.

## PERSONALS AND OBITUARIES.

Aucker, Walter, 281.

Bryan, R. W., 426.

Canon, C. H., 426.  
Congratulatory, 190.  
Corthell, E. L., 426.  
Cronise, Mr. Ernest S., 523.

Grieves, E. W., 281.

Jenks, C. H., 426.

Lauder, James Nelson, 472.

Luce, Edward F., 281.

Manchester, Mr. Geo. O., 231.  
Martin, Edward, 48.  
McLaren, D., 426.  
Mendenhall, C. M., 231.

Newell, John, 472.

Paschke & Kelley, Messrs., 48.  
Ponsonby, C. C., 426.  
Posey, E. E., 281.

Pressenger, Mr. Winfield Price, 523.

Ricker, Robert E., 335.  
Rosing, W. H., 189.

Sheldon, Charles A., 568.  
Smith, Mr. Willard A., 523.

Wade, R. D., 473.  
Wall, Edward Barry, 231.  
Wilbur, Rollin H., 189.  
Williams, Mr. B. J., 231.  
Winter, O. O., 426.

## NOTES AND NEWS.

Accles Machine Gun, 59.  
Aerial Locomotion, Discussing, 567.  
Aerial Railway at Gibraltar, 197.  
Agricultural Machinery in Southern Russia, The, 351.  
Air into the Earth, Pumping, 441.  
Air Power for Street Cars, 135.  
Air-Pump, First Test of the, 56.  
Aluminum Bullets, 56.  
Aluminium Horse Shoes, 157.  
Aluminium for Lithography, 247.  
Aluminium in Place of Tin, 56.  
Aluminium for Gasholders, 56.  
American International Association of Railway Superintendents of Bridges and Buildings, 471, 567.  
American Railway Master Mechanics' Association, 281, 567.  
American Society of Mechanical Engineers, 231, 279.  
American Steamers, The New Atlantic, 490.  
Arctic Ocean, Rail to the, 246.

Armor Plates in the British Navy, 197.  
Armor Plate Tests at Bethlehem, 537.  
Armor Plate, Test of, 246.  
Armor Plate, Trial of, 138.  
Armor Plate, Trial of Harveyized, 349.  
Armstrong Manufacturing Co., The, 234.  
Artificial Lights, Comparison of, 57.  
Association of Engineers, 426.  
Association of Engineers of the South, 280.  
Association Engineers of Virginia, 188, 280, 379.  
Austrian Mitrailleuse, A New, 247.  
Axles, Crank, 160.

Baker, William C., 234.  
Balloon Ascension in the United States, The First, 56.  
Baltimore & Ohio R. R. Cos., The, 234.  
Baltimore & Ohio's Cut-off at Harper's Ferry, The, 156.  
Basic Slag as Manure, 58.  
Battleship, A New British, 488.  
Battleships for England, New, 56.

Benzine Wagon, 56.  
Bertrand Rustless Process, 139.  
Bicycling, French Doctors on, 539.  
Bloomburg Car Company, The, 338.  
Boilers and Machinery in the British Navy, 197.  
Boilers, An Improvement in Furnace, 58.  
Boilers, Explosion of, 27, 489.  
Boilers for the "Powerful" and "Terrible," 187.  
Boilers, Hand-hole Cover for, 57.  
Boiler, Spray in the, 247.  
Boring 8000 ft. Through Rock, 301.  
Boston Society of Civil Engineers, 281.  
Bridge Across the Delaware, The Great Railway, 488.  
Bridge, A New Mississippi River, 156.  
Bridge, The Hudson River, 300.  
Buffington-Crozier 10-in. Disappearing Gun Carriage, 493.  
Buoy, Illuminated Life, 246.  
Canal, A Trans-Jersey Ship, 539.  
Canal Boat Resistance, 393.

- Canal Boats, Electric, 188.  
 Canvas Cofferdams, 302.  
 Carbonic Acid, Disincrustation of Boilers with Liquid, 57.  
 Cars, Spanish, 156.  
 Castle in the Air, A, 56.  
 Central Railway Club, Meetings of the, 48, 523.  
 "Centurion," British Battleship, 187.  
 Chicago, Milwaukee & St. Paul Ry. Co., 234.  
 Chignecto Ship Railway, 490.  
 China and Japan, The Warships of, 440.  
 Chinese Navy Worthless, The, 103.  
 Chinese Obstacles to Railroad Building, 158.  
 Chinese Railroad Employees, 430.  
 Chinese Railroads, 302.  
 Cincinnati, The, 347.  
 Civil Engineers' Society of St. Paul, 189, 281.  
 Cleveland Twist Drill Company, The, 234.  
 Coal Dust in London, England, Utilization of, 58.  
 Coal in Mexico, 351.  
 Coaling System, Lewis & Hunter's, 158.  
 Coal Washing, 350.  
 Cofferdams, Canvas, 302.  
 Color for Torpedo Boats, The Proper, 95.  
 Commerce Destroyer, A, 103.  
 Compound Locomotive of the Richmond Locomotive Works, 159.  
 Compressed Air in a Coal Mine, 393.  
 Compressed Air on the West Shore Railroad, The Use of, 350.  
 Condenser, A Type of, 57.  
 Congo Road, Travel on the, 57.  
 Conundrum, 539.  
 Copenhagen, Tunnel and Bridge to, 57.  
 Copper and Zinc, Hardness of, 57.  
 Correction, A, 430.  
 Corrosion of Water Pipes, 347.  
 Cotton, Method of Baling, 158.  
 Cotton Mills in Egypt, 249.  
 Counterweight for Electric Cars, 58.  
 Cramps and British Warships, 300.  
 Crank Axles, 160.  
 Delaware & Hudson Shop Tools, 440.  
 Detrick & Harvey Machine Co., The, 234.  
 Detroit Graphite Manufacturing Co., 234.  
 Dining Cars, English, 246.  
 Disappearing Gun Carriage Trial, 43.  
 Discussions at the Conventions, 343.  
 Disincrustation of Boilers with Liquid Carbonic Acid, 57.  
 Drainage Canal for the City of Mexico, 301.  
 Dredge "Ram," Test of the United States, 188.  
 Driving Springs, Device for Removing, 537.  
 Dryness of Steam, Testing the, 349.  
 East River Tunnel, The, 430.  
 Egypt, Cotton Mills in, 249.  
 Electrical Experiments by the U. S. Lighthouse Board, Mysterious, 488.  
 Electrical Schools, 489.  
 Electric Canal Boats, 188.  
 Electric Gondolas in Venice, 187.  
 Electricity as a Motive Power, 159.  
 Electricity in Lighthouses, 301.  
 Electricity, Long-Distance, 539.  
 Electricity in Workshops, 441.  
 Electric Lighting with Gas Motors, The Expense of, 349.  
 Electric Road, Conversion of a Steam into an, 138.  
 Elementary Body Discovered in the Atmosphere, A New, 441.  
 Engineering Association of the South, 231.  
 Engineering Education, A Defect in, 440.  
 Engineers' Club of Cincinnati, 189, 281.  
 Engineers' Club of Philadelphia, 95, 189, 379.  
 Engineers' Club of St. Louis, 48, 189, 281, 522, 567.  
 Engineers' Society of Western Pennsylvania, Proceedings of the, 48, 95, 280.  
 Engine, Raising a 60-Ton, 157.  
 "Ericsson," The, 248.  
 Fastest Ship in the World, The, 349.  
 Felling Trees by Electricity, 246.  
 Fire-Proof Insulation, 300.  
 Firing Two Guns at Once, Effect of, 538.  
 Four-Wheeled Coupled Tank Locomotive on the London & Southwestern Railway, 349.  
 French Railways, 301.  
 Gas Lighting, Incandescent, 158.  
 Gas Motors, The Expense of Electric Lighting with, 349.  
 Gauge for Measuring Distances Between the Inside of Wheel Flanges, 440.  
 Gold Mining from a River-Bed, 58.  
 Gun, Accles Machine, 59.  
 Gun, A New, 56.  
 Gunboats, Contract for, 43.  
 Gunboats, Unsafe, 95.  
 Gun Work Rejected, 392.  
 Hand-hole Cover for Boilers, 57.  
 Hardness of Copper and Zinc, 57.  
 Hargraves' Experiments, 578.  
 Harveyized Armor Plate, Trial of, 349.  
 High Temperatures, Measuring, 43.  
 Holder for Tap in a Drill Press, 440.  
 Holland, Railway Pension Fund of, 246.  
 Holloway, Engineering Feat at, 249.  
 Hoppes Manufacturing Co., The, 234.  
 Hudson River Bridge, The, 302.  
 Hungarian Railway Tickets, 57.  
 Hungarian Zone System, The, 139.  
 Illuminated Life Buoy, 246.  
 Illumination, Brooklyn Bridge Car, 488.  
 Imperial Train for Foreign Travel, The New Russian, 363.  
 Incandescent Gas Lighting, 158.  
 "Indian Engineering," The, 157.  
 India's Telegraph Service, 56.  
 Insulating Material, A New, 56.  
 International Railway Congress, 280, 380.  
 Iron and Steel, The Extensibility of, 441.  
 Iron Bridge, The First, 247.  
 Italian Petroleum, 56.  
 Japan, Railroads in, 159.  
 Japanese Torpedo-Boats, 103.  
 Joseph Dixon Crucible Co., The, 234.  
 Jungfrau, Projected Line up the, 248.  
 "Kearsarge," The Loss of the, 103.  
 Kites, Life-Saving, 103.  
 Krupp, The Large, 156.  
 Lewis & Hunter's Coaling System, 158.  
 Life on an Iron Clad at Sea, 538.  
 Lighthouse Without an Attendant, 158.  
 Liverpool Engineering Society, 139, 188.  
 Liverpool Station in London, 197.  
 Local Traffic, The, 347.  
 Locomotives in Germany and England, Freight, 394.  
 Locomotive, Model of, 159.  
 Locomotive of the Richmond Locomotive Works, Compound, 159.  
 Locomotive on the London and South Western Railway, Four Wheeled Coupled Tank, 349.  
 Locomotives, German, 197.  
 Locomotives on the Northwestern Railway of Switzerland, Compound, 538.  
 Locomotives, Use of Petroleum on, 350.  
 London Railway Station, A Peculiar, 246.  
 Longest Railway Tangent in the World, 56.  
 Machine Guns, Tests of, 351.  
 Machine Work of the Bethlehem Iron Co., 538.  
 Mahogany Pavements in Paris, 301.  
 "Maine," Official Trial of the United States Battleship, 488.  
 Manganese in Manganese Bronze, Rapid Method for the Determination of, 160.  
 Manure, Basic Slag as, 58.  
 Master Car & Locomotive Painters' Association, 426.  
 Master Car Builders' Association, 281, 379, 471, 567.  
 Mechanical Traction of Paris Street Cars, 439.  
 Meteoric Photography, 488.  
 Microscope, A Colossal, 57, 300, 371, 430.  
 "Minneapolis," The, 300.  
 Mississippi River Bridge, A New, 156.  
 Mitrailleuse, A New Austrian, 247.  
 Mojave Desert, Irrigation of the, 56.  
 "Monteroy's" Plate to be Drilled, The, 300.  
 "Montgomery," The Cruiser, 103.  
 "Navarin," Russian Armored Ship, 247.  
 Navy, Wooden Ships in the, 95.  
 Navy Yard at Algiers, The New, 539.  
 Newark by Trolley, To, 440.  
 New York Railroad Club, 189, 472, 566.  
 "New York," The, 430.  
 Non-Shrinking Timber, 58.  
 "North America," The Lake Steamer, 247.  
 Northwestern Railway Club, 189.  
 Oil Burning on the Austrian State Railways, 539.  
 Oil Wells, The Oldest, 488.  
 "Olympia," The Cruiser, 103.  
 "Olympia," Trial of the Cruiser, 43.  
 One-Hundred Pound Rail on the Consolidated Road, A, 56.  
 Omission, An, 56.  
 Panama Canal, The, 491.  
 Parrots as Station Callers, 156.  
 Patent Office, Work of the, 489.  
 Pension Fund of Holland, 246.  
 Pensions on the Prussian State Railway, 393.  
 Perilous Ride, A, 488.  
 Petroleum and Coal Tar, 58.  
 Petroleum for Fuel in Buenos Ayres, 247.  
 Petroleum, Italian, 56.  
 Petroleum on Locomotives, Use of, 350.  
 Photographing Projectiles in Transit, 56.  
 Pneumatic Tubes in Chicago, 139.  
 Poor's Manual, 335.  
 Power, Cost of Transmitting, 247.  
 Preservation of Wood, 57.  
 Priscilla, The, 371.  
 Projectiles in Transit, Photographing, 56.  
 Prussian State Railway, Pensions on the, 393.  
 Pumps for the Navy, 234.  
 Punch, Hand Boiler, 492.  
 Purdue Laboratory, Restoration of, 301.  
 Purdue University Laboratory, 248.  
 Quicksands, Building on, 393.  
 Railroad, Light Experimental, 537.  
 Railroad through the Sea, 197.  
 Railroads, Ownership of, 538.  
 Railroads in Japan, 159.  
 Railway Accidents in Great Britain, 392.  
 Railway in the Holy Land, 43.  
 Railway Pension Fund of Holland, 246.  
 Railway Station, A Peculiar London, 246.  
 Railway Tangent in the World, Longest, 56.  
 Railway Wrecks, Summary of, 44.  
 Rain-making, New Process of, 56.  
 Raising a 60-Ton Engine, 157.  
 Rapid-Fire Guns at Sandy Hook, Test of, 301.  
 "Resolution," Damage to the, 301.  
 Richmond Locomotive Works, Compound Locomotive of the, 159.  
 Riehle Brothers Testing Machine Company, 834.  
 Rifles, New Army, 491.  
 River Navigation in Russia, 364.  
 Rolling Stock at the Antwerp Exposition, 539.  
 Ruskin on Locomotives, 430.  
 Russian Armored Ship "Navarin," 247.  
 Russian Battleship, A New, 439.  
 Russian Engineering Notes, 362.  
 Russian Imperial Train for Foreign Travel, The New, 363.  
 Schenectady Locomotive Works, The, 234.  
 Sea-Coast Defenses, 43.  
 Serve Tubes, Tests of, 491.  
 Sewers, Ventilation of, 57.  
 Sheathing and Speed, 489.  
 Sheffield Velocipede Car Company, The, 234.  
 Shingles, Experiments with, 57.  
 Ships for the Manchester Canal, 56.  
 Ship Railway on the Columbia River, 439.  
 Siberian Railroad, The New Terms of Construction of the Great, 363.  
 Siberian Rivers and Navigation, 363.  
 Signal Device, New, 160.  
 Six-Camera Telescope, 430.  
 Small Arm for the Navy, New, 394.  
 Smokeless Powder, New, 57, 301.  
 Spanish Cars, 156.  
 Spray in the Boiler, 247.  
 Standard Brake Company, 430.  
 Standard Time in Italy, 40.  
 Station, A Peculiar London Railway, 246.  
 Steamer for Russian Prisoners, A, 362.  
 Steam into an Electric Road, Conversion of a, 138.  
 Steam Pipes, Cement for, 57.  
 Steel Castings, Specifications for, 301.  
 Steel Plate, Large, 439.  
 Superheated Steam, 537.  
 Susquehanna Tunnel, 138.  
 Swiss Cable Railways, 197.  
 Swiss Railways, 351.  
 Tank on a Smoke-Stack, 537.  
 Tanks, Experimental Naval, 300.  
 Telephone, An Ancient, 249.  
 Telephone, Pocket, 56.  
 Telescope Stand, A Universal, 157.  
 Temperatures, Measuring High, 43.  
 Thinnest Metal Sheet, The, 159.  
 Ticket on the Belgian State Railways, Novel, 43.  
 Tickets, Hungarian Railway, 57.  
 Ticket-Selling on the North London Railway, 422.  
 Timber, Non-Shrinking, 58.  
 Timber Tests, 138.  
 Torpedo-Boat, Boilers in French, 488.  
 Torpedo Boat, Fast, 56.  
 Torpedo Boats, Corrosion of French, 489.  
 Torpedo Boats, Foreign, 188.  
 Torpedo Boats in the Manœuvres of the British Fleet, The Failure of, 492.  
 Torpedo Boats, The New, 439, 536.  
 Torpedo Boats, The Proper Color for, 95.  
 Torpedo-Boat Trial, New English, 488.  
 Town Refuse as Fuel, 393.  
 Track Shifting, Novel Method of, 59.  
 Transmitting Power, Cost of, 247.  
 Truck used for Hydraulic Jacks, 440.  
 Tunnel and Bridge to Copenhagen, 57.  
 Turrets of the Monitors, 301.  
 Two-Thousand Volt Electric Current, A, 246.  
 Underground Traction, 247.  
 Universal Exposition at Amsterdam, 1895.  
 University of California, 430.  
 Unsafe Gunboats, 95.  
 Ventilation of Sewers, 57.  
 Water Pipes, Corrosion of, 347.  
 Water Power, Railway Trains Run by, 246.  
 Weights, Handling Great, 393.  
 Westinghouse, Church, Kerr & Co., Messrs., 234.  
 West Shore Railroad, The Use of Compressed Air, 350.  
 Windmills for Electrical Lighting, 246.  
 Wind Power and Electricity, 157.  
 Wire Rope, Preservation of, 43.  
 Women in Railway and Postal Service, 349.  
 Wooden Ships in the Navy, 95.  
 Wood, German Process of Drying, 195.  
 Wood, Preservation of, 57.  
 Worst Railway in England, The, 350.  
 Wrecks, Summary of Railway, 44.  
 Zuyder Zee, Draining of the, 371.



